Abstract of the Disclosure

A semiconductor optical device includes a waveguide layer (10) and a reflecting multi-layer film (20). The waveguide layer includes two cladding layers and an active layer sandwiched between the two cladding layers. The reflecting multi-layer film is formed on at least one of a pair of opposing end faces of the waveguide layer. A summation $\Sigma n_i d_i$ of products $n_i d_i$ of refractive index n_i and film thickness d_i of a layer denoted with i in the reflecting multi-layer film, and a wavelength λ_0 of light guided through the waveguide layer satisfies a relationship, $\Sigma n_i d_i > \lambda_0/4$. A first wavelength bandwidth $\Delta\lambda$ is wider than a second wavelength bandwidth $\Delta\Lambda$. The $\Delta\lambda$ is a wavelength range including the wavelength λ_0 in which a reflectance R of the reflecting multi-layer film is not higher than +2.0% from reflectance R at the wavelength λ_0. The $\Delta\Lambda$ is a wavelength range including the wavelength λ_0 in which a reflectance R' of a hypothetical layer is not higher than +2.0% from a hypothetical reflectance R' at the wavelength λ_0 of a hypothetical layer having a thickness of $5\lambda_0/(4n_f)$ of a refractive index n_f formed on the at least one of opposing end faces satisfies a relationship, $R' = ((n_c - n_f^2)/(n_c + n_f^2))^2$. The n_c denotes an effective refractive index of the waveguide layer.